

## SEQUENCE LISTING

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<120> NOVEL STRAIN OF SARS-ASSOCIATED CORONAVIRUS AND APPLICATIONS THEREOF.

<130> 226-108ext

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cagatcaact	cacaccagct	tggcgcatat	attctactgg	aaacaatgta	ttccagactc	1980
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atggttacaa	tcttgctttg	ttgcatgact	agttgttgca	gttgccctcaa	gggtgcatgc	1860
tcttgtggtt	cttgctgcaa	gtttgatgag	gatgactctg	agccagttct	caagggtgtc	1920
aaattacatt	acacataaac	gaacttatgg	atttgtttat	gagatttttt	actcttggat	1980
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gcttgctgct	480
acaatgcata	540
caagaaccca	600
ctactgtata	660
ttcaacacca	720
aggtgttaaa	780
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gcttggttaa	900
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agcacaagaa	1020
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ttaccatcta	480
tctatgcctt	540
ggctttgttg	600
gctggcacac	660
tcgttactga	720
gttattctga	780
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 acacataaac gaactt atg gat ttg ttt atg aga ttt ttt act ctt gga tca 172  
 Met Asp Leu Phe Met Arg Phe Phe Thr Leu Gly Ser  
 1 5 10  
 att act gca cag cca gta aaa att gac aat gct tct cct gca agt act 220  
 Ile Thr Ala Gln Pro Val Lys Ile Asp Asn Ala Ser Pro Ala Ser Thr  
 15 20 25  
 gtt cat gct aca gca acg ata ccg cta caa gcc tca ctc cct ttc gga 268  
 Val His Ala Thr Ala Thr Ile Pro Leu Gln Ala Ser Leu Pro Phe Gly  
 30 35 40  
 tgg ctt gtt att ggc gtt gca ttt ctt gct gtt ttt cag agc gct acc 316  
 Trp Leu Val Ile Gly Val Ala Phe Leu Ala Val Phe Gln Ser Ala Thr  
 45 50 55 60  
 aaa ata att gcg ctc aat aaa aga tgg cag cta gcc ctt tat aag ggc 364  
 Lys Ile Ile Ala Leu Asn Lys Arg Trp Gln Leu Ala Leu Tyr Lys Gly  
 65 70 75  
 ttc cag ttc att tgc aat tta ctg ctg cta ttt gtt acc atc tat tca 412  
 Phe Gln Phe Ile Cys Asn Leu Leu Leu Phe Val Thr Ile Tyr Ser  
 80 85 90  
 cat ctt ttg ctt gtc gct gca ggt atg gag gcg caa ttt ttg tac ctc 460  
 His Leu Leu Leu Val Ala Ala Gly Met Glu Ala Gln Phe Leu Tyr Leu  
 95 100 105  
 tat gcc ttg ata tat ttt cta caa tgc atc aac gca tgt aga att att 508  
 Tyr Ala Leu Ile Tyr Phe Leu Gln Cys Ile Asn Ala Cys Arg Ile Ile  
 110 115 120  
 atg aga tgt tgg ctt tgt tgg aag tgc aaa tcc aag aac cca tta ctt 556  
 Met Arg Cys Trp Leu Cys Trp Lys Cys Lys Ser Lys Asn Pro Leu Leu  
 125 130 135 140  
 tat gat gcc aac tac ttt gtt tgc tgg cac aca cat aac tat gac tac 604  
 Tyr Asp Ala Asn Tyr Phe Val Cys Trp His Thr His Asn Tyr Asp Tyr  
 145 150 155  
 tgt ata cca tat aac agt gtc aca gat aca att gtc gtt act gaa ggt 652  
 Cys Ile Pro Tyr Asn Ser Val Thr Asp Thr Ile Val Val Thr Glu Gly  
 160 165 170  
 gac ggc att tca aca cca aaa ctc aaa gaa gac tac caa att ggt ggt 700  
 Asp Gly Ile Ser Thr Pro Lys Leu Lys Glu Asp Tyr Gln Ile Gly Gly  
 175 180 185  
 tat tct gag gat agg cac tca ggt gtt aaa gac tat gtc gtt gta cat 748  
 Tyr Ser Glu Asp Arg His Ser Gly Val Lys Asp Tyr Val Val Val His  
 190 195 200  
 ggc tat ttc acc gaa gtt tac tac cag ctt gag tct aca caa att act 796  
 Gly Tyr Phe Thr Glu Val Tyr Tyr Gln Leu Glu Ser Thr Gln Ile Thr  
 205 210 215 220  
 aca gac act ggt att gaa aat gct aca ttc ttc atc ttt aac aag ctt 844  
 Thr Asp Thr Gly Ile Glu Asn Ala Thr Phe Phe Ile Phe Asn Lys Leu  
 225 230 235  
 gtt aaa gac cca ccg aat gtg caa ata cac aca atc gac ggc tct tca 892  
 Val Lys Asp Pro Pro Asn Val Gln Ile His Thr Ile Asp Gly Ser Ser  
 240 245 250

gga gtt gct aat cca gca atg gat cca att tat gat gag ccg acg acg 940  
 Gly Val Ala Asn Pro Ala Met Asp Pro Ile Tyr Asp Glu Pro Thr Thr  
           255                          260                          265  
 act act agc gtg cct ttg taagcacaag aaagtgagta cgaacttatg 988  
 Thr Thr Ser Val Pro Leu  
           270  
 tactcattcg tttcggaaga aacaggtaacg ttaatagtta atagcgtact tctttttctt 1048  
 gctttcgtgg tattcttgct agtcacacta gccatcctta ctgcgctt 1096

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 <212> PRT  
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           20                          25                          30  
 Ala Thr Ile Pro Leu Gln Ala Ser Leu Pro Phe Gly Trp Leu Val Ile  
           35                          40                          45  
 Gly Val Ala Phe Leu Ala Val Phe Gln Ser Ala Thr Lys Ile Ile Ala  
           50                          55                          60  
 Leu Asn Lys Arg Trp Gln Leu Ala Leu Tyr Lys Gly Phe Gln Phe Ile  
 65                          70                          75                          80  
 Cys Asn Leu Leu Leu Leu Phe Val Thr Ile Tyr Ser His Leu Leu Leu  
           85                          90                          95  
 Val Ala Ala Gly Met Glu Ala Gln Phe Leu Tyr Leu Tyr Ala Leu Ile  
           100                          105                          110  
 Tyr Phe Leu Gln Cys Ile Asn Ala Cys Arg Ile Ile Met Arg Cys Trp  
           115                          120                          125  
 Leu Cys Trp Lys Cys Lys Ser Lys Asn Pro Leu Leu Tyr Asp Ala Asn  
           130                          135                          140  
 Tyr Phe Val Cys Trp His Thr His Asn Tyr Asp Tyr Cys Ile Pro Tyr  
 145                          150                          155                          160  
 Asn Ser Val Thr Asp Thr Ile Val Val Thr Glu Gly Asp Gly Ile Ser  
           165                          170                          175  
 Thr Pro Lys Leu Lys Glu Asp Tyr Gln Ile Gly Gly Tyr Ser Glu Asp  
           180                          185                          190  
 Arg His Ser Gly Val Lys Asp Tyr Val Val Val His Gly Tyr Phe Thr  
           195                          200                          205  
 Glu Val Tyr Tyr Gln Leu Glu Ser Thr Gln Ile Thr Thr Asp Thr Gly  
           210                          215                          220  
 Ile Glu Asn Ala Thr Phe Phe Ile Phe Asn Lys Leu Val Lys Asp Pro  
 225                          230                          235                          240  
 Pro Asn Val Gln Ile His Thr Ile Asp Gly Ser Ser Gly Val Ala Asn  
           245                          250                          255  
 Pro Ala Met Asp Pro Ile Tyr Asp Glu Pro Thr Thr Thr Thr Ser Val  
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 Pro Leu

<210> 11  
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 <212> DNA  
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 acagccagta aaaattgaca atgcttctcc tgcaagtact gttcatgcta cagcaacgat 240  
 accgctacaa gcctcactcc ctttcggatg gcttgttatt ggcgttgcat ttcttgcgtg 300  
 ttttcagagc gctaccaaaa taattgcgct caataaaaga tggcagctag ccctttataa 360  
 gggcttccag ttcatttgca atttactgct gctatttgtt accatctatt cacatctttt 420  
 gcttgtcgct gcaggtatgg aggcgcaatt tttgtacctc tatgccttga tatattttct 480  
 acaatgcac aacgcatgta gaattattat gagatgttgg ctttgttgga agtgcaaate 540  
 caagaacca ttacttt atg atg cca act act ttg ttt gct ggc aca cac 590

Met Met Pro Thr Thr Leu Phe Ala Gly Thr His

1

5

10

ata act atg act act gta tac cat ata aca gtg tca cag ata caa ttg 638  
 Ile Thr Met Thr Thr Val Tyr His Ile Thr Val Ser Gln Ile Gln Leu

15

20

25

tcg tta ctg aag gtg acg gca ttt caa cac caa aac tca aag aag act 686  
 Ser Leu Leu Lys Val Thr Ala Phe Gln His Gln Asn Ser Lys Lys Thr

30

35

40

acc aaa ttg gtg gtt att ctg agg ata ggc act cag gtg tta aag act 734  
 Thr Lys Leu Val Val Ile Leu Arg Ile Gly Thr Gln Val Leu Lys Thr

45

50

55

atg tcg ttg tac atg gct att tca ccg aag ttt act acc agc ttg agt 782  
 Met Ser Leu Tyr Met Ala Ile Ser Pro Lys Phe Thr Thr Ser Leu Ser

60

65

70

75

cta cac aaa tta cta cag aca ctg gta ttg aaa atg cta cat tct tca 830  
 Leu His Lys Leu Leu Gln Thr Leu Val Leu Lys Met Leu His Ser Ser

80

85

90

tct tta aca agc ttg tta aag acc cac cga atg tgc aaa tac aca caa 878  
 Ser Leu Thr Ser Leu Leu Lys Thr His Arg Met Cys Lys Tyr Thr Gln

95

100

105

tcg acg gct ctt cag gag ttg cta atc cag caa tgg atc caa ttt atg 926  
 Ser Thr Ala Leu Gln Glu Leu Leu Ile Gln Gln Trp Ile Gln Phe Met

110

115

120

atg agc cga cga cga cta cta gcg tgc ctt tgt aag cac aag aaa gtg 974  
 Met Ser Arg Arg Arg Leu Leu Ala Cys Leu Cys Lys His Lys Lys Val

125

130

135

agt acg aac tta tgt act cat tcg ttt cgg aag aaa cag gta cgt 1019  
 Ser Thr Asn Leu Cys Thr His Ser Phe Arg Lys Lys Gln Val Arg

140

145

150

taatagttaa tagcgtaactt ctttttcttg ctttcgttgg attcttgcta gtcacactag 1079  
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<211> 154

<212> PRT

<213> CORONAVIRUS

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Val Tyr His Ile Thr Val Ser Gln Ile Gln Leu Ser Leu Leu Lys Val  
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Thr Ala Phe Gln His Gln Asn Ser Lys Lys Thr Thr Lys Leu Val Val  
 35 40 45

Ile Leu Arg Ile Gly Thr Gln Val Leu Lys Thr Met Ser Leu Tyr Met  
 50 55 60

Ala Ile Ser Pro Lys Phe Thr Thr Ser Leu Ser Leu His Lys Leu Leu  
 65 70 75 80

Gln Thr Leu Val Leu Lys Met Leu His Ser Ser Ser Leu Thr Ser Leu  
 85 90 95

Leu Lys Thr His Arg Met Cys Lys Tyr Thr Gln Ser Thr Ala Leu Gln  
 100 105 110

Glu Leu Leu Ile Gln Gln Trp Ile Gln Phe Met Met Ser Arg Arg Arg  
 115 120 125  
 Leu Leu Ala Cys Leu Cys Lys His Lys Lys Val Ser Thr Asn Leu Cys  
 130 135 140  
 Thr His Ser Phe Arg Lys Lys Gln Val Arg  
 145 150

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 Glu Glu Thr Gly Thr Leu Ile Val Asn Ser Val Leu Leu Phe Leu Ala  
 10 15 20  
 ttc gtg gta ttc ttg cta gtc aca cta gcc atc ctt act gcg ctt cga 149  
 Phe Val Val Phe Leu Leu Val Thr Leu Ala Ile Leu Thr Ala Leu Arg  
 25 30 35  
 ttg tgt gcg tac tgc tgc aat att gtt aac gtg agt tta gta aaa cca 197  
 Leu Cys Ala Tyr Cys Cys Asn Ile Val Asn Val Ser Leu Val Lys Pro  
 40 45 50  
 acg gtt tac gtc tac tcg cgt gtt aaa aat ctg aac tct tct gaa gga 245  
 Thr Val Tyr Val Tyr Ser Arg Val Lys Asn Leu Asn Ser Ser Glu Gly  
 55 60 65 70  
 gtt cct gat ctt ctg gtc taaacgaact aactattatt attattctgt 293  
 Val Pro Asp Leu Leu Val  
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 ttggaacttt aacattgctt atcatggcag acaacggta 332

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 Ile Leu Thr Ala Leu Arg Leu Cys Ala Tyr Cys Cys Asn Ile Val Asn  
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 Leu Asn Ser Ser Glu Gly Val Pro Asp Leu Leu Val  
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<210> 15  
 <211> 332  
 <212> DNA  
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tcacactagc catccttact gcgcttcgat tgtgtgcgta ctgctgcaat attgttaacg 180
tgagtttagt aaaaccaacg gtttacgtct actcgcgtgt taaaaatctg aactcttctg 240
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<210> 16
<211> 708
<212> DNA
<213> CORONAVIRUS

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<220>
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<222> (41) .. (703)
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Thr Ile Thr Val Glu Glu Leu Lys Gln Leu Leu Glu Gln Trp Asn Leu
10 15 20

gta ata ggt ttc cta ttc cta gcc tgg att atg tta cta caa ttt gcc 151
Val Ile Gly Phe Leu Phe Leu Ala Trp Ile Met Leu Leu Gln Phe Ala
25 30 35

tat tct aat cgg aac agg ttt ttg tac ata ata aag ctt gtt ttc ctc 199
Tyr Ser Asn Arg Asn Arg Phe Leu Tyr Ile Ile Lys Leu Val Phe Leu
40 45 50

tgg ctc ttg tgg cca gta aca ctt gct tgt ttt gtg ctt gct gct gtc 247
Trp Leu Leu Trp Pro Val Thr Leu Ala Cys Phe Val Leu Ala Ala Val
55 60 65

tac aga att aat tgg gtg act ggc ggg att gcg att gca atg gct tgt 295
Tyr Arg Ile Asn Trp Val Thr Gly Gly Ile Ala Ile Ala Met Ala Cys
70 75 80 85

att gta ggc ttg atg tgg ctt agc tac ttc gtt gct tcc ttc agg ctg 343
Ile Val Gly Leu Met Trp Leu Ser Tyr Phe Val Ala Ser Phe Arg Leu
90 95 100

ttt gct cgt acc cgc tca atg tgg tca ttc aac cca gaa aca aac att 391
Phe Ala Arg Thr Arg Ser Met Trp Ser Phe Asn Pro Glu Thr Asn Ile
105 110 115

ctt ctc aat gtg cct ctc cgg ggg aca att gtg acc aga ccg ctc atg 439
Leu Leu Asn Val Pro Leu Arg Gly Thr Ile Val Thr Arg Pro Leu Met
120 125 130

gaa agt gaa ctt gtc att ggt gct gtg atc att cgt ggt cac ttg cga 487
Glu Ser Glu Leu Val Ile Gly Ala Val Ile Ile Arg Gly His Leu Arg
135 140 145

atg gcc gga cac tcc cta ggg cgc tgt gac att aag gac ctg cca aaa 535
Met Ala Gly His Ser Leu Gly Arg Cys Asp Ile Lys Asp Leu Pro Lys
150 155 160 165

gag atc act gtg gct aca tca cga acg ctt tct tat tac aaa tta gga 583
Glu Ile Thr Val Ala Thr Ser Arg Thr Leu Ser Tyr Tyr Lys Leu Gly
170 175 180

gcg tcg cag cgt gta ggc act gat tca ggt ttt gct gca tac aac cgc 631
Ala Ser Gln Arg Val Gly Thr Asp Ser Gly Phe Ala Ala Tyr Asn Arg
185 190 195

tac cgt att gga aac tat aaa tta aat aca gac cac gcc ggt agc aac 679
Tyr Arg Ile Gly Asn Tyr Lys Leu Asn Thr Asp His Ala Gly Ser Asn
200 205 210

gac aat att gct ttg cta gta cag taagt 708
Asp Asn Ile Ala Leu Leu Val Gln
215 220

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<210> 17  
 <211> 221  
 <212> PRT  
 <213> CORONAVIRUS

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 20 25 30  
 Leu Leu Gln Phe Ala Tyr Ser Asn Arg Asn Arg Phe Leu Tyr Ile Ile  
 35 40 45  
 Lys Leu Val Phe Leu Trp Leu Leu Trp Pro Val Thr Leu Ala Cys Phe  
 50 55 60  
 Val Leu Ala Ala Val Tyr Arg Ile Asn Trp Val Thr Gly Gly Ile Ala  
 65 70 75 80  
 Ile Ala Met Ala Cys Ile Val Gly Leu Met Trp Leu Ser Tyr Phe Val  
 85 90 95  
 Ala Ser Phe Arg Leu Phe Ala Arg Thr Arg Ser Met Trp Ser Phe Asn  
 100 105 110  
 Pro Glu Thr Asn Ile Leu Leu Asn Val Pro Leu Arg Gly Thr Ile Val  
 115 120 125  
 Thr Arg Pro Leu Met Glu Ser Glu Leu Val Ile Gly Ala Val Ile Ile  
 130 135 140  
 Arg Gly His Leu Arg Met Ala Gly His Ser Leu Gly Arg Cys Asp Ile  
 145 150 155 160  
 Lys Asp Leu Pro Lys Glu Ile Thr Val Ala Thr Ser Arg Thr Leu Ser  
 165 170 175  
 Tyr Tyr Lys Leu Gly Ala Ser Gln Arg Val Gly Thr Asp Ser Gly Phe  
 180 185 190  
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 195 200 205  
 His Ala Gly Ser Asn Asp Asn Ile Ala Leu Leu Val Gln  
 210 215 220

<210> 18  
 <211> 769  
 <212> DNA  
 <213> CORONAVIRUS

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 aatggaacct agtaataggt ttcctattcc tagcctggat tatgttacta caatttgcct 180  
 attctaactg gaacagggtt ttgtacataa taaagcttgt tttcctctgg ctcttgtggc 240  
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 <212> DNA  
 <213> CORONAVIRUS

<400> 19  
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Leu Phe Leu Thr Leu Ile Val Phe Thr Ser Cys Glu Leu Tyr His Tyr  
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cag gag tgt gtt aga ggt acg act gta cta cta aaa gaa cct tgc cca 392  
Gln Glu Cys Val Arg Gly Thr Thr Val Leu Leu Lys Glu Pro Cys Pro  
25 30 35  
tca gga aca tac gag ggc aat tca cca ttt cac cct ctt gct gac aat 440  
Ser Gly Thr Tyr Glu Gly Asn Ser Pro Phe His Pro Leu Ala Asp Asn  
40 45 50  
aaa ttt gca cta act tgc act agc aca cac ttt gct ttt gct tgt gct 488  
Lys Phe Ala Leu Thr Cys Thr Ser Thr His Phe Ala Phe Ala Cys Ala  
55 60 65  
gac ggt act cga cat acc tat cag ctg cgt gca aga tca gtt tca cca 536  
Asp Gly Thr Arg His Thr Tyr Gln Leu Arg Ala Arg Ser Val Ser Pro  
70 75 80  
aaa ctt ttc atc aga caa gag gag gtt caa caa gag ctc tac tcg cca 584  
Lys Leu Phe Ile Arg Gln Glu Glu Val Gln Gln Glu Leu Tyr Ser Pro  
85 90 95 100  
ctt ttt ctc att gtt gct gct cta gta ttt tta ata ctt tgc ttc acc 632  
Leu Phe Leu Ile Val Ala Ala Leu Val Phe Leu Ile Leu Cys Phe Thr  
105 110 115  
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Ile Lys Arg Lys Thr Glu  
120  
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<212> PRT  
<213> CORONAVIRUS

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Glu Pro Cys Pro Ser Gly Thr Tyr Glu Gly Asn Ser Pro Phe His Pro  
35 40 45  
Leu Ala Asp Asn Lys Phe Ala Leu Thr Cys Thr Ser Thr His Phe Ala  
50 55 60  
Phe Ala Cys Ala Asp Gly Thr Arg His Thr Tyr Gln Leu Arg Ala Arg  
65 70 75 80  
Ser Val Ser Pro Lys Leu Phe Ile Arg Gln Glu Glu Val Gln Gln Glu  
85 90 95  
Leu Tyr Ser Pro Leu Phe Leu Ile Val Ala Ala Leu Val Phe Leu Ile  
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Leu Cys Phe Thr Ile Lys Arg Lys Thr Glu  
115 120  
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<211> 1231

<212> DNA  
<213> CORONAVIRUS

<220>  
<221> CDS  
<222> (650) .. (781)  
<223>

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tcctgacatt gattgtattt acatcttgcg agctatatca ctatcaggag tgtgttagag 360  
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ctgctctagt atttttaata ctttgcttca ccattaagag aaagacaga atg aat gag 658  
Met Asn Glu  
1  
ctc act tta att gac ttc tat ttg tgc ttt tta gcc ttt ctg cta ttc 706  
Leu Thr Leu Ile Asp Phe Tyr Leu Cys Phe Leu Ala Phe Leu Leu Phe  
5 10 15  
ctt gtt tta ata atg ctt att ata ttt tgg ttt tca ctc gaa atc cag 754  
Leu Val Leu Ile Met Leu Ile Ile Phe Trp Phe Ser Leu Glu Ile Gln  
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Asp Leu Glu Glu Pro Cys Thr Lys Val  
40  
cattggtttg acttggtattt ctctatgcag ttgcatatgc actgtagtac agcgctgtgc 861  
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ggaggacgca 1231

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<211> 44  
<212> PRT  
<213> CORONAVIRUS

<400> 26  
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Glu Ile Gln Asp Leu Glu Glu Pro Cys Thr Lys Val  
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<210> 27  
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<212> DNA  
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<220>  
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Met Lys Leu Leu Ile Val Leu Thr Cys Ile Ser Leu Cys

1

5

10

agt tgc ata tgc act gta gta cag cgc tgt gca tct aat aaa cct cat	877
Ser Cys Ile Cys Thr Val Val Gln Arg Cys Ala Ser Asn Lys Pro His	
15 20 25	

gtg ctt gaa gat cct tgt aag gta caa cac taggggtaat acttatagca	927
Val Leu Glu Asp Pro Cys Lys Val Gln His	
30 35	

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cgca						1231

&lt;210&gt; 28

&lt;211&gt; 39

&lt;212&gt; PRT

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 28

Met Lys Leu Leu Ile Val Leu Thr Cys Ile Ser Leu Cys Ser Cys Ile	
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20 25 30	
Asp Pro Cys Lys Val Gln His	
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&lt;210&gt; 29

&lt;211&gt; 1231

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (876) .. (1127)

&lt;223&gt;

&lt;400&gt; 29

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Met Cys Leu Lys Ile Leu

1

5

gta agg tac aac act agg ggt aat act tat agc act gct tgg ctt tgt 941  
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10

15

20

gct cta gga aag gtt tta cct ttt cat aga tgg cac act atg gtt caa 989  
 Ala Leu Gly Lys Val Leu Pro Phe His Arg Trp His Thr Met Val Gln

25

30

35

aca tgc aca cct aat gtt act atc aac tgt caa gat cca gct ggt ggt 1037  
 Thr Cys Thr Pro Asn Val Thr Ile Asn Cys Gln Asp Pro Ala Gly Gly

40

45

50

gcg ctt ata gct agg tgt tgg tac ctt cat gaa ggt cac caa act gct 1085  
 Ala Leu Ile Ala Arg Cys Trp Tyr Leu His Glu Gly His Gln Thr Ala

55

60

65

70

gca ttt aga gac gta ctt gtt gtt tta aat aaa cga aca aat 1127  
 Ala Phe Arg Asp Val Leu Val Val Leu Asn Lys Arg Thr Asn

75

80

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<211> 84

<212> PRT

<213> CORONAVIRUS

<400> 30

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Trp His Thr Met Val Gln Thr Cys Thr Pro Asn Val Thr Ile Asn Cys  
 35 40 45

Gln Asp Pro Ala Gly Gly Ala Leu Ile Ala Arg Cys Trp Tyr Leu His  
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Glu Gly His Gln Thr Ala Ala Phe Arg Asp Val Leu Val Val Leu Asn  
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Lys Arg Thr Asn

<210> 31

<211> 21221

<212> DNA

<213> CORONAVIRUS

<400> 31

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Leu	Glu	Ala	Arg	Ala	Phe	Gln	Ser	Thr	Pro	Ile	Val	Val	Gln	Met	Thr



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Phe Tyr Tyr Leu Gly Thr Gly Pro Glu Ala Ser Leu Pro Tyr Gly Ala	
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Asn Lys Glu Gly Ile Val Trp Val Ala Thr Glu Gly Ala Leu Asn Thr	
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Pro Lys Asp His Ile Gly Thr Arg Asn Pro Asn Asn Asn Ala Ala Thr	
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Val Leu Gln Leu Pro Gln Gly Thr Thr Leu Pro Lys Gly Phe Tyr Ala	
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Ser Arg Gly Asn Ser Arg Asn Ser Thr Pro Gly Ser Ser Arg Gly Asn	
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Ser Pro Ala Arg Met Ala Ser Gly Gly Glu Thr Ala Leu Ala Leu	
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gca tct aaa aag cct cgc caa aaa cgt act gcc aca aaa cag tac aac	876
Ala Ser Lys Lys Pro Arg Gln Lys Arg Thr Ala Thr Lys Gln Tyr Asn	
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gtc act caa gca ttt ggg aga cgt ggt cca gaa caa acc caa gga aat	924
Val Thr Gln Ala Phe Gly Arg Arg Gly Pro Glu Gln Thr Gln Gly Asn	
275 280 285	
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Ser Arg Ile Gly Met Glu Val Thr Pro Ser Gly Thr Trp Leu Thr Tyr	
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Thr Glu Pro Lys Lys Asp Lys Lys Lys Lys Thr Asp Glu Ala Gln Pro	
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 85 90 95  
 Gly Gly Asp Gly Lys Met Lys Glu Leu Ser Pro Arg Trp Tyr Phe Tyr  
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 Tyr Leu Gly Thr Gly Pro Glu Ala Ser Leu Pro Tyr Gly Ala Asn Lys  
 115 120 125  
 Glu Gly Ile Val Trp Val Ala Thr Glu Gly Ala Leu Asn Thr Pro Lys  
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 Gln Gln Gln Gly Gln Thr Val Thr Lys Lys Ser Ala Ala Glu Ala Ser  
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 Lys Lys Pro Arg Gln Lys Arg Thr Ala Thr Lys Gln Tyr Asn Val Thr  
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 Ile Ala Gln Phe Ala Pro Ser Ala Ser Ala Phe Phe Gly Met Ser Arg  
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 325 330 335  
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 355 360 365  
 Pro Lys Lys Asp Lys Lys Lys Lys Thr Asp Glu Ala Gln Pro Leu Pro  
 370 375 380



Gln Arg Gln Lys Lys Gln Pro Thr Val Thr Leu Leu Pro Ala Ala Asp  
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&lt;211&gt; 448

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 41

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&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 42

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<400> 43

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<400> 44

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&lt;211&gt; 1050

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 45

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&lt;210&gt; 46

&lt;211&gt; 1995

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 46

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&lt;210&gt; 47

&lt;211&gt; 1884

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 47

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&lt;210&gt; 48

&lt;211&gt; 2020

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 48

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&lt;210&gt; 49

&lt;211&gt; 2040

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 49

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&lt;210&gt; 50

&lt;211&gt; 2012

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 50

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&lt;210&gt; 51

&lt;211&gt; 1877

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 51

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 <212> DNA  
 <213> CORONAVIRUS

<400> 52						
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&lt;210&gt; 53

&lt;211&gt; 2075

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 53

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&lt;210&gt; 54

&lt;211&gt; 1891

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 54

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aattaagagg aactgctgta atgtctctta aggagaatca aatcaatgat atgattttatt 1080
ctcttctgga aaaaggtagg cttatcatta gagaaaacaa cagagttgtg gtttcaagtg 1140
atattcttgt taacaactaa acgaacatgt ttattttctt attatttctt actctcacta 1200
gtggtagtga ccttgaccgg tgcaccactt ttgatgatgt tcaagctcct aattacactc 1260
aacatacttc atctatgagg ggggtttact atcctgatga aattttttaga tcagacactc 1320
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cagagaatc aaatgttgtc cgtgggtggg tttttgggtc taccatgaac aacaagtcac 1500
agtcgggtgat tattattaac aattctacta atgttggtat acgagcatgt aactttgaat 1560
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tattcgataa tgcatttaat tgcactttcg agtacatata tgatgccttt tcgcttgatg 1680
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ggtttctcta tgtttataag ggctatcaac ctatagatgt agttcgtgat ctaccttctg 1800
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 <211> 33  
 <212> DNA  
 <213> Sc and SL antisens primer  
  
 <400> 59  
 cccccgggtt taatatattg ctcatatttt ccc 33  
  
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 <213> Sens set 1 primer  
  
 <400> 60  
 ggcatcgat gggttg 16  
  
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 <212> DNA  
 <213> Antisens set 2 (28774-28759) primer  
  
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 cagtttcacc acctcc 16  
  
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 ggctactacc gaagag 16  
  
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 aattaccgag actacg 16  
  
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21

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<213> Probe 1/set 2 /probe N/FL (28541-28563)

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23

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<213> Probe 2/set 2/probe SARS/N/LC705 (28565-28589)

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25

<210> 68

<211> 30

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<223> Anchor primer 14T

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30

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<223> M2-14 peptide

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Ala Asp Asn Gly Thr Ile Thr Val Glu Glu Leu Lys Gln

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<210> 70

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5

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<210> 71

<211> 24

<212> PRT

<213> artificial sequence

&lt;220&gt;

&lt;223&gt; E53-72 peptide

&lt;400&gt; 71

Lys Pro Thr Val Tyr Val Tyr Ser Arg Val Lys Asn Leu Asn Ser Ser  
 1 5 10 15

Glu Gly Val Pro Asp Leu Leu Val  
 20

&lt;210&gt; 72

&lt;211&gt; 153

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 72

gatattaggt ttttacctac ccaggaaaag ccaaccaacc tcgatctctt gtagatctgt 60  
 tctctaaacg aacttttaaaa tctgtgtagc tgctgctcgg ctgcatgcct agtgcaccta 120  
 cgcagtataa acaataataa attttactgt cgt 153

&lt;210&gt; 73

&lt;211&gt; 410

&lt;212&gt; DNA

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 73

ttctccagac aacttcaaaa ttccatgagt ggagcttctg ctgattcaac tcaggcataa 60  
 acactcatga tgaccacaca aggcagatgg gctatgtaaa cgttttcgca attccgttta 120  
 cgatacatag tctactcttg tgcagaatga attctcgtaa ctaaacagca caagtaggtt 180  
 tagttaactt taatctcaca tagcaatctt taatcaatgt gtaacattag ggaggacttg 240  
 aaagagccac cacattttca tcgaggccac gcggagtacg atcgagggta cagtgaataa 300  
 tgctagggag agctgcctat atggaagagc cctaattgtgt aaaattaatt ttagtagtgc 360  
 tatecccatg tgattttaat agcttcttag gagaatgaca aaaaaaaaaa 410

&lt;210&gt; 74

&lt;211&gt; 4382

&lt;212&gt; PRT

&lt;213&gt; CORONAVIRUS

&lt;400&gt; 74

Met Glu Ser Leu Val Leu Gly Val Asn Glu Lys Thr His Val Gln Leu  
 1 5 10 15  
 Ser Leu Pro Val Leu Gln Val Arg Asp Val Leu Val Arg Gly Phe Gly  
 20 25 30  
 Asp Ser Val Glu Glu Ala Leu Ser Glu Ala Arg Glu His Leu Lys Asn  
 35 40 45  
 Gly Thr Cys Gly Leu Val Glu Leu Glu Lys Gly Val Leu Pro Gln Leu  
 50 55 60  
 Glu Gln Pro Tyr Val Phe Ile Lys Arg Ser Asp Ala Leu Ser Thr Asn  
 65 70 75 80  
 His Gly His Lys Val Val Glu Leu Val Ala Glu Met Asp Gly Ile Gln  
 85 90 95  
 Tyr Gly Arg Ser Gly Ile Thr Leu Gly Val Leu Val Pro His Val Gly  
 100 105 110  
 Glu Thr Pro Ile Ala Tyr Arg Asn Val Leu Leu Arg Lys Asn Gly Asn  
 115 120 125  
 Lys Gly Ala Gly Gly His Ser Tyr Gly Ile Asp Leu Lys Ser Tyr Asp  
 130 135 140  
 Leu Gly Asp Glu Leu Gly Thr Asp Pro Ile Glu Asp Tyr Glu Gln Asn  
 145 150 155 160  
 Trp Asn Thr Lys His Gly Ser Gly Ala Leu Arg Glu Leu Thr Arg Glu  
 165 170 175

Leu	Asn	Gly	Gly	Ala	Val	Thr	Arg	Tyr	Val	Asp	Asn	Asn	Phe	Cys	Gly	180	185	190
Pro	Asp	Gly	Tyr	Pro	Leu	Asp	Cys	Ile	Lys	Asp	Phe	Leu	Ala	Arg	Ala	195	200	205
Gly	Lys	Ser	Met	Cys	Thr	Leu	Ser	Glu	Gln	Leu	Asp	Tyr	Ile	Glu	Ser	210	215	220
Lys	Arg	Gly	Val	Tyr	Cys	Cys	Arg	Asp	His	Glu	His	Glu	Ile	Ala	Trp	225	230	240
Phe	Thr	Glu	Arg	Ser	Asp	Lys	Ser	Tyr	Glu	His	Gln	Thr	Pro	Phe	Glu	245	250	255
Ile	Lys	Ser	Ala	Lys	Lys	Phe	Asp	Thr	Phe	Lys	Gly	Glu	Cys	Pro	Lys	260	265	270
Phe	Val	Phe	Pro	Leu	Asn	Ser	Lys	Val	Lys	Val	Ile	Gln	Pro	Arg	Val	275	280	285
Glu	Lys	Lys	Lys	Thr	Glu	Gly	Phe	Met	Gly	Arg	Ile	Arg	Ser	Val	Tyr	290	295	300
Pro	Val	Ala	Ser	Pro	Gln	Glu	Cys	Asn	Asn	Met	His	Leu	Ser	Thr	Leu	305	310	320
Met	Lys	Cys	Asn	His	Cys	Asp	Glu	Val	Ser	Trp	Gln	Thr	Cys	Asp	Phe	325	330	335
Leu	Lys	Ala	Thr	Cys	Glu	His	Cys	Gly	Thr	Glu	Asn	Leu	Val	Ile	Glu	340	345	350
Gly	Pro	Thr	Thr	Cys	Gly	Tyr	Leu	Pro	Thr	Asn	Ala	Val	Val	Lys	Met	355	360	365
Pro	Cys	Pro	Ala	Cys	Gln	Asp	Pro	Glu	Ile	Gly	Pro	Glu	His	Ser	Val	370	375	380
Ala	Asp	Tyr	His	Asn	His	Ser	Asn	Ile	Glu	Thr	Arg	Leu	Arg	Lys	Gly	385	390	400
Gly	Arg	Thr	Arg	Cys	Phe	Gly	Gly	Cys	Val	Phe	Ala	Tyr	Val	Gly	Cys	405	410	415
Tyr	Asn	Lys	Arg	Ala	Tyr	Trp	Val	Pro	Arg	Ala	Ser	Ala	Asp	Ile	Gly	420	425	430
Ser	Gly	His	Thr	Gly	Ile	Thr	Gly	Asp	Asn	Val	Glu	Thr	Leu	Asn	Glu	435	440	445
Asp	Leu	Leu	Glu	Ile	Leu	Ser	Arg	Glu	Arg	Val	Asn	Ile	Asn	Ile	Val	450	455	460
Gly	Asp	Phe	His	Leu	Asn	Glu	Glu	Val	Ala	Ile	Ile	Leu	Ala	Ser	Phe	465	470	480
Ser	Ala	Ser	Thr	Ser	Ala	Phe	Ile	Asp	Thr	Ile	Lys	Ser	Leu	Asp	Tyr	485	490	495
Lys	Ser	Phe	Lys	Thr	Ile	Val	Glu	Ser	Cys	Gly	Asn	Tyr	Lys	Val	Thr	500	505	510
Lys	Gly	Lys	Pro	Val	Lys	Gly	Ala	Trp	Asn	Ile	Gly	Gln	Gln	Arg	Ser	515	520	525
Val	Leu	Thr	Pro	Leu	Cys	Gly	Phe	Pro	Ser	Gln	Ala	Ala	Gly	Val	Ile	530	535	540
Arg	Ser	Ile	Phe	Ala	Arg	Thr	Leu	Asp	Ala	Ala	Asn	His	Ser	Ile	Pro	545	550	555
Asp	Leu	Gln	Arg	Ala	Ala	Val	Thr	Ile	Leu	Asp	Gly	Ile	Ser	Glu	Gln	565	570	575
Ser	Leu	Arg	Leu	Val	Asp	Ala	Met	Val	Tyr	Thr	Ser	Asp	Leu	Leu	Thr	580	585	590
Asn	Ser	Val	Ile	Ile	Met	Ala	Tyr	Val	Thr	Gly	Gly	Leu	Val	Gln	Gln	595	600	605
Thr	Ser	Gln	Trp	Leu	Ser	Asn	Leu	Leu	Gly	Thr	Thr	Val	Glu	Lys	Leu	610	615	620
Arg	Pro	Ile	Phe	Glu	Trp	Ile	Glu	Ala	Lys	Leu	Ser	Ala	Gly	Val	Glu	625	630	640
Phe	Leu	Lys	Asp	Ala	Trp	Glu	Ile	Leu	Lys	Phe	Leu	Ile	Thr	Gly	Val	645	650	655
Phe	Asp	Ile	Val	Lys	Gly	Gln	Ile	Gln	Val	Ala	Ser	Asp	Asn	Ile	Lys	660	665	670

Asp	Cys	Val	Lys	Cys	Phe	Ile	Asp	Val	Val	Asn	Lys	Ala	Leu	Glu	Met
		675					680					685			
Cys	Ile	Asp	Gln	Val	Thr	Ile	Ala	Gly	Ala	Lys	Leu	Arg	Ser	Leu	Asn
		690					695				700				
Leu	Gly	Glu	Val	Phe	Ile	Ala	Gln	Ser	Lys	Gly	Leu	Tyr	Arg	Gln	Cys
705					710					715					720
Ile	Arg	Gly	Lys	Glu	Gln	Leu	Gln	Leu	Leu	Met	Pro	Leu	Lys	Ala	Pro
				725					730						735
Lys	Glu	Val	Thr	Phe	Leu	Glu	Gly	Asp	Ser	His	Asp	Thr	Val	Leu	Thr
			740					745					750		
Ser	Glu	Glu	Val	Val	Leu	Lys	Asn	Gly	Glu	Leu	Glu	Ala	Leu	Glu	Thr
		755					760					765			
Pro	Val	Asp	Ser	Phe	Thr	Asn	Gly	Ala	Ile	Val	Gly	Thr	Pro	Val	Cys
		770				775					780				
Val	Asn	Gly	Leu	Met	Leu	Leu	Glu	Ile	Lys	Asp	Lys	Glu	Gln	Tyr	Cys
785					790					795					800
Ala	Leu	Ser	Pro	Gly	Leu	Leu	Ala	Thr	Asn	Asn	Val	Phe	Arg	Leu	Lys
				805					810						815
Gly	Gly	Ala	Pro	Ile	Lys	Gly	Val	Thr	Phe	Gly	Glu	Asp	Thr	Val	Trp
			820					825					830		
Glu	Val	Gln	Gly	Tyr	Lys	Asn	Val	Arg	Ile	Thr	Phe	Glu	Leu	Asp	Glu
		835					840					845			
Arg	Val	Asp	Lys	Val	Leu	Asn	Glu	Lys	Cys	Ser	Val	Tyr	Thr	Val	Glu
		850				855					860				
Ser	Gly	Thr	Glu	Val	Thr	Glu	Phe	Ala	Cys	Val	Val	Ala	Glu	Ala	Val
865					870					875					880
Val	Lys	Thr	Leu	Gln	Pro	Val	Ser	Asp	Leu	Leu	Thr	Asn	Met	Gly	Ile
				885					890					895	
Asp	Leu	Asp	Glu	Trp	Ser	Val	Ala	Thr	Phe	Tyr	Leu	Phe	Asp	Asp	Ala
		900						905					910		
Gly	Glu	Glu	Asn	Phe	Ser	Ser	Arg	Met	Tyr	Cys	Ser	Phe	Tyr	Pro	Pro
		915					920					925			
Asp	Glu	Glu	Glu	Glu	Asp	Asp	Ala	Glu	Cys	Glu	Glu	Glu	Glu	Ile	Asp
		930				935					940				
Glu	Thr	Cys	Glu	His	Glu	Tyr	Gly	Thr	Glu	Asp	Asp	Tyr	Gln	Gly	Leu
945					950					955					960
Pro	Leu	Glu	Phe	Gly	Ala	Ser	Ala	Glu	Thr	Val	Arg	Val	Glu	Glu	Glu
			965						970					975	
Glu	Glu	Glu	Asp	Trp	Leu	Asp	Asp	Thr	Thr	Glu	Gln	Ser	Glu	Ile	Glu
		980						985					990		
Pro	Glu	Pro	Glu	Pro	Thr	Pro	Glu	Glu	Pro	Val	Asn	Gln	Phe	Thr	Gly
		995				1000						1005			
Tyr	Leu	Lys	Leu	Thr	Asp	Asn	Val	Ala	Ile	Lys	Cys	Val	Asp	Ile	
	1010					1015					1020				
Val	Lys	Glu													

Ala Leu Tyr Glu Gln Val Val	Met Asp Tyr Leu Asp	Asn Leu Lys
1160	1165	1170
Pro Arg Val Glu Ala Pro Lys	Gln Glu Glu Pro Pro	Asn Thr Glu
1175	1180	1185
Asp Ser Lys Thr Glu Glu Lys	Ser Val Val Gln Lys	Pro Val Asp
1190	1195	1200
Val Lys Pro Lys Ile Lys Ala	Cys Ile Asp Glu Val	Thr Thr Thr
1205	1210	1215
Leu Glu Glu Thr Lys Phe Leu	Thr Asn Lys Leu Leu	Leu Phe Ala
1220	1225	1230
Asp Ile Asn Gly Lys Leu Tyr	His Asp Ser Gln Asn	Met Leu Arg
1235	1240	1245
Gly Glu Asp Met Ser Phe Leu	Glu Lys Asp Ala Pro	Tyr Met Val
1250	1255	1260
Gly Asp Val Ile Thr Ser Gly	Asp Ile Thr Cys Val	Val Ile Pro
1265	1270	1275
Ser Lys Lys Ala Gly Gly Thr	Thr Glu Met Leu Ser	Arg Ala Leu
1280	1285	1290
Lys Lys Val Pro Val Asp Gly	Tyr Ile Thr Thr Tyr	Pro Gly Gln
1295	1300	1305
Gly Cys Ala Gly Tyr Thr Leu	Glu Glu Ala Lys Thr	Ala Leu Lys
1310	1315	1320
Lys Cys Lys Ser Ala Phe Tyr	Val Leu Pro Ser Glu	Ala Pro Asn
1325	1330	1335
Ala Lys Glu Glu Ile Leu Gly	Thr Val Ser Trp Asn	Leu Arg Glu
1340	1345	1350
Met Leu Ala His Ala Glu Glu	Thr Arg Lys Leu Met	Pro Ile Cys
1355	1360	1365
Met Asp Val Arg Ala Ile Met	Ala Thr Ile Gln Arg	Lys Tyr Lys
1370	1375	1380
Gly Ile Lys Ile Gln Glu Gly	Ile Val Asp Tyr Gly	Val Arg Phe
1385	1390	1395
Phe Phe Tyr Thr Ser Lys Glu	Pro Val Ala Ser Ile	Ile Thr Lys
1400	1405	1410
Leu Asn Ser Leu Asn Glu Pro	Leu Val Thr Met Pro	Ile Gly Tyr
1415	1420	1425
Val Thr His Gly Phe Asn Leu	Glu Glu Ala Ala Arg	Cys Met Arg
1430	1435	1440
Ser Leu Lys Ala Pro Ala Val	Val Ser Val Ser Ser	Pro Asp Ala
1445	1450	1455
Val Thr Thr Tyr Asn Gly Tyr	Leu Thr Ser Ser Ser	Lys Thr Ser
1460	1465	1470
Glu Glu His Phe Val Glu Thr	Val Ser Leu Ala Gly	Ser Tyr Arg
1475	1480	1485
Asp Trp Ser Tyr Ser Gly Gln	Arg Thr Glu Leu Gly	Val Glu Phe
1490	1495	1500
Leu Lys Arg Gly Asp Lys Ile	Val Tyr His Thr Leu	Glu Ser Pro
1505	1510	1515
Val Glu Phe His Leu Asp Gly	Glu Val Leu Ser Leu	Asp Lys Leu
1520	1525	1530
Lys Ser Leu Leu Ser Leu Arg	Glu Val Lys Thr Ile	Lys Val Phe
1535	1540	1545
Thr Thr Val Asp Asn Thr Asn	Leu His Thr Gln Leu	Val Asp Met
1550	1555	1560
Ser Met Thr Tyr Gly Gln Gln	Phe Gly Pro Thr Tyr	Leu Asp Gly
1565	1570	1575
Ala Asp Val Thr Lys Ile Lys	Pro His Val Asn His	Glu Gly Lys
1580	1585	1590
Thr Phe Phe Val Leu Pro Ser	Asp Asp Thr Leu Arg	Ser Glu Ala
1595	1600	1605
Phe Glu Tyr Tyr His Thr Leu	Asp Glu Ser Phe Leu	Gly Arg Tyr
1610	1615	1620



Met	Ser	Ala	Leu	Asn	His	Thr	Lys	Lys	Trp	Lys	Phe	Pro	Gln	Val
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Gly	Gly	Leu	Thr	Ser	Ile	Lys	Trp	Ala	Asp	Asn	Asn	Cys	Tyr	Leu
1640						1645					1650			
Ser	Ser	Val	Leu	Leu	Ala	Leu	Gln	Gln	Leu	Glu	Val	Lys	Phe	Asn
1655						1660					1665			
Ala	Pro	Ala	Leu	Gln	Glu	Ala	Tyr	Tyr	Arg	Ala	Arg	Ala	Gly	Asp
1670						1675					1680			
Ala	Ala	Asn	Phe	Cys	Ala	Leu	Ile	Leu	Ala	Tyr	Ser	Asn	Lys	Thr
1685						1690					1695			
Val	Gly	Glu	Leu	Gly	Asp	Val	Arg	Glu	Thr	Met	Thr	His	Leu	Leu
1700						1705					1710			
Gln	His	Ala	Asn	Leu	Glu	Ser	Ala	Lys	Arg	Val	Leu	Asn	Val	Val
1715						1720					1725			
Cys	Lys	His	Cys	Gly	Gln	Lys	Thr	Thr	Thr	Leu	Thr	Gly	Val	Glu
1730						1735					1740			
Ala	Val	Met	Tyr	Met	Gly	Thr	Leu	Ser	Tyr	Asp	Asn	Leu	Lys	Thr
1745						1750					1755			
Gly	Val	Ser	Ile	Pro	Cys	Val	Cys	Gly	Arg	Asp	Ala	Thr	Gln	Tyr
1760						1765					1770			
Leu	Val	Gln	Gln	Glu	Ser	Ser	Phe	Val	Met	Met	Ser	Ala	Pro	Pro
1775						1780					1785			
Ala	Glu	Tyr	Lys	Leu	Gln	Gln	Gly	Thr	Phe	Leu	Cys	Ala	Asn	Glu
1790						1795					1800			
Tyr	Thr	Gly	Asn	Tyr	Gln	Cys	Gly	His	Tyr	Thr	His	Ile	Thr	Ala
1805						1810					1815			
Lys	Glu	Thr	Leu	Tyr	Arg	Ile	Asp	Gly	Ala	His	Leu	Thr	Lys	Met
1820						1825					1830			
Ser	Glu	Tyr	Lys	Gly	Pro	Val	Thr	Asp	Val	Phe	Tyr	Lys	Glu	Thr
1835						1840					1845			
Ser	Tyr	Thr	Thr	Thr	Ile	Lys	Pro	Val	Ser	Tyr	Lys	Leu	Asp	Gly
1850						1855					1860			
Val	Thr	Tyr	Thr	Glu	Ile	Glu	Pro	Lys	Leu	Asp	Gly	Tyr	Tyr	Lys
1865						1870					1875			
Lys	Asp	Asn	Ala	Tyr	Tyr	Thr	Glu	Gln	Pro	Ile	Asp	Leu	Val	Pro
1880						1885					1890			
Thr	Gln	Pro	Leu	Pro	Asn	Ala	Ser	Phe	Asp	Asn	Phe	Lys	Leu	Thr
1895						1900					1905			
Cys	Ser	Asn	Thr	Lys	Phe	Ala	Asp	Asp	Leu	Asn	Gln	Met	Thr	Gly
1910						1915					1920			
Phe	Thr	Lys	Pro	Ala	Ser	Arg	Glu	Leu	Ser	Val	Thr	Phe	Phe	Pro
1925						1930					1935			
Asp	Leu	Asn	Gly	Asp	Val	Val	Ala	Ile	Asp	Tyr	Arg	His	Tyr	Ser
1940						1945					1950			
Ala	Ser	Phe	Lys	Lys	Gly	Ala	Lys	Leu	Leu	His	Lys	Pro	Ile	Val
1955						1960					1965			
Trp	His	Ile	Asn	Gln	Ala	Thr	Thr	Lys	Thr	Thr	Phe	Lys	Pro	Asn
1970						1975					1980			
Thr	Trp	Cys	Leu	Arg	Cys	Leu	Trp	Ser	Thr	Lys	Pro	Val	Asp	Thr
1985						1990					1995			
Ser	Asn	Ser	Phe	Glu	Val	Leu	Ala	Val	Glu	Asp	Thr	Gln	Gly	Met
2000						2005					2010			
Asp	Asn	Leu	Ala	Cys	Glu	Ser	Gln	Gln	Pro	Thr	Ser	Glu	Glu	Val
2015						2020					2025			
Val	Glu	Asn	Pro	Thr	Ile	Gln	Lys	Glu	Val	Ile	Glu	Cys	Asp	Val
2030						2035					2040			
Lys	Thr	Thr	Glu	Val	Val	Gly	Asn	Val	Ile	Leu	Lys	Pro	Ser	Asp
2045						2050					2055			
Glu	Gly	Val	Lys	Val	Thr	Gln	Glu	Leu	Gly	His	Glu	Asp	Leu	Met
2060						2065					2070			
Ala	Ala	Tyr	Val	Glu	Asn	Thr	Ser	Ile	Thr	Ile	Lys	Lys	Pro	Asn
2075						2080					2085			

Glu Leu Ser Leu Ala Leu Gly	Leu Lys Thr Ile Ala Thr His Gly
2090	2095 2100
Ile Ala Ala Ile Asn Ser Val	Pro Trp Ser Lys Ile Leu Ala Tyr
2105	2110 2115
Val Lys Pro Phe Leu Gly Gln	Ala Ala Ile Thr Thr Ser Asn Cys
2120	2125 2130
Ala Lys Arg Leu Ala Gln Arg	Val Phe Asn Asn Tyr Met Pro Tyr
2135	2140 2145
Val Phe Thr Leu Leu Phe Gln	Leu Cys Thr Phe Thr Lys Ser Thr
2150	2155 2160
Asn Ser Arg Ile Arg Ala Ser	Leu Pro Thr Thr Ile Ala Lys Asn
2165	2170 2175
Ser Val Lys Ser Val Ala Lys	Leu Cys Leu Asp Ala Gly Ile Asn
2180	2185 2190
Tyr Val Lys Ser Pro Lys Phe	Ser Lys Leu Phe Thr Ile Ala Met
2195	2200 2205
Trp Leu Leu Leu Leu Ser Ile	Cys Leu Gly Ser Leu Ile Cys Val
2210	2215 2220
Thr Ala Ala Phe Gly Val Leu	Leu Ser Asn Phe Gly Ala Pro Ser
2225	2230 2235
Tyr Cys Asn Gly Val Arg Glu	Leu Tyr Leu Asn Ser Ser Asn Val
2240	2245 2250
Thr Thr Met Asp Phe Cys Glu	Gly Ser Phe Pro Cys Ser Ile Cys
2255	2260 2265
Leu Ser Gly Leu Asp Ser Leu	Asp Ser Tyr Pro Ala Leu Glu Thr
2270	2275 2280
Ile Gln Val Thr Ile Ser Ser	Tyr Lys Leu Asp Leu Thr Ile Leu
2285	2290 2295
Gly Leu Ala Ala Glu Trp Val	Leu Ala Tyr Met Leu Phe Thr Lys
2300	2305 2310
Phe Phe Tyr Leu Leu Gly Leu	Ser Ala Ile Met Gln Val Phe Phe
2315	2320 2325
Gly Tyr Phe Ala Ser His Phe	Ile Ser Asn Ser Trp Leu Met Trp
2330	2335 2340
Phe Ile Ile Ser Ile Val Gln	Met Ala Pro Val Ser Ala Met Val
2345	2350 2355
Arg Met Tyr Ile Phe Phe Ala	Ser Phe Tyr Tyr Ile Trp Lys Ser
2360	2365 2370
Tyr Val His Ile Met Asp Gly	Cys Thr Ser Ser Thr Cys Met Met
2375	2380 2385
Cys Tyr Lys Arg Asn Arg Ala	Thr Arg Val Glu Cys Thr Thr Ile
2390	2395 2400
Val Asn Gly Met Lys Arg Ser	Phe Tyr Val Tyr Ala Asn Gly Gly
2405	2410 2415
Arg Gly Phe Cys Lys Thr His	Asn Trp Asn Cys Leu Asn Cys Asp
2420	2425 2430
Thr Phe Cys Thr Gly Ser Thr	Phe Ile Ser Asp Glu Val Ala Arg
2435	2440 2445
Asp Leu Ser Leu Gln Phe Lys	Arg Pro Ile Asn Pro Thr Asp Gln
2450	2455 2460
Ser Ser Tyr Ile Val Asp Ser	Val Ala Val Lys Asn Gly Ala Leu
2465	2470 2475
His Leu Tyr Phe Asp Lys Ala	Gly Gln Lys Thr Tyr Glu Arg His
2480	2485 2490
Pro Leu Ser His Phe Val Asn	Leu Asp Asn Leu Arg Ala Asn Asn
2495	2500 2505
Thr Lys Gly Ser Leu Pro Ile	Asn Val Ile Val Phe Asp Gly Lys
2510	2515 2520
Ser Lys Cys Asp Glu Ser Ala	Ser Lys Ser Ala Ser Val Tyr Tyr
2525	2530 2535
Ser Gln Leu Met Cys Gln Pro	Ile Leu Leu Leu Asp Gln Ala Leu
2540	2545 2550

Val	Ser	Asp	Val	Gly	Asp	Ser	Thr	Glu	Val	Ser	Val	Lys	Met	Phe
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Glu	Lys	Leu	Lys	Ala	Leu	Val	Ala	Thr	Ala	His	Ser	Glu	Leu	Ala
2585						2590					2595			
Lys	Gly	Val	Ala	Leu	Asp	Gly	Val	Leu	Ser	Thr	Phe	Val	Ser	Ala
2600						2605					2610			
Ala	Arg	Gln	Gly	Val	Val	Asp	Thr	Asp	Val	Asp	Thr	Lys	Asp	Val
2615						2620					2625			
Ile	Glu	Cys	Leu	Lys	Leu	Ser	His	His	Ser	Asp	Leu	Glu	Val	Thr
2630						2635					2640			
Gly	Asp	Ser	Cys	Asn	Asn	Phe	Met	Leu	Thr	Tyr	Asn	Lys	Val	Glu
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Asn	Met	Thr	Pro	Arg	Asp	Leu	Gly	Ala	Cys	Ile	Asp	Cys	Asn	Ala
2660						2665					2670			
Arg	His	Ile	Asn	Ala	Gln	Val	Ala	Lys	Ser	His	Asn	Val	Ser	Leu
2675						2680					2685			
Ile	Trp	Asn	Val	Lys	Asp	Tyr	Met	Ser	Leu	Ser	Glu	Gln	Leu	Arg
2690						2695					2700			
Lys	Gln	Ile	Arg	Ser	Ala	Ala	Lys	Lys	Asn	Asn	Ile	Pro	Phe	Arg
2705						2710					2715			
Leu	Thr	Cys	Ala	Thr	Thr	Arg	Gln	Val	Val	Asn	Val	Ile	Thr	Thr
2720						2725					2730			
Lys	Ile	Ser	Leu	Lys	Gly	Gly	Lys	Ile	Val	Ser	Thr	Cys	Phe	Lys
2735						2740					2745			
Leu	Met	Leu	Lys	Ala	Thr	Leu	Leu	Cys	Val	Leu	Ala	Ala	Leu	Val
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Cys	Tyr	Ile	Val	Met	Pro	Val	His	Thr	Leu	Ser	Ile	His	Asp	Gly
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Tyr	Thr	Asn	Glu	Ile	Ile	Gly	Tyr	Lys	Ala	Ile	Gln	Asp	Gly	Val
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Thr	Arg	Asp	Ile	Ile	Ser	Thr	Asp	Asp	Cys	Phe	Ala	Asn	Lys	His
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Ala	Gly	Phe	Asp	Ala	Trp	Phe	Ser	Gln	Arg	Gly	Gly	Ser	Tyr	Lys
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Asn	Asp	Lys	Ser	Cys	Pro	Val	Val	Ala	Ala	Ile	Ile	Thr	Arg	Glu
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Ile	Gly	Phe	Ile	Val	Pro	Gly	Leu	Pro	Gly	Thr	Val	Leu	Arg	Ala
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Val	Gly	Asn	Ile	Cys	Tyr	Thr	Pro	Ser	Lys	Leu	Ile	Glu	Tyr	Ser
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Phe	Lys	Asp	Ala	Met	Gly	Lys	Pro	Val	Pro	Tyr	Cys	Tyr	Asp	Thr
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Thr	Tyr	Leu	Glu	Gly	Ser	Val	Arg	Val	Val	Thr	Thr	Phe	Asp	Ala
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Glu	Tyr	Cys	Arg	His	Gly	Thr	Cys	Glu	Arg	Ser	Glu	Val	Gly	Ile
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Cys	Leu	Ser	Thr	Ser	Gly	Arg	Trp	Val	Leu	Asn	Asn	Glu	His	Tyr
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Ile	Ala	Asn	Ile	Phe	Thr	Pro	Leu	Val	Gln	Pro	Val	Gly	Ala	Leu
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Asp	Val	Ser	Ala	Ser	Val	Val	Ala	Gly	Gly	Ile	Ile	Ala	Ile	Leu
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Val	Thr	Cys	Ala	Ala	Tyr	Tyr	Phe	Met	Lys	Phe	Arg	Arg	Val	Phe
3035						3040					3045			
Gly	Glu	Tyr	Asn	His	Val	Val	Ala	Ala	Asn	Ala	Leu	Leu	Phe	Leu
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Met	Ser	Phe	Thr	Ile	Leu	Cys	Leu	Val	Pro	Ala	Tyr	Ser	Phe	Leu
3065						3070					3075			
Pro	Gly	Val	Tyr	Ser	Val	Phe	Tyr	Leu	Tyr	Leu	Thr	Phe	Tyr	Phe
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Thr	Asn	Asp	Val	Ser	Phe	Leu	Ala	His	Leu	Gln	Trp	Phe	Ala	Met
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Phe	Ser	Pro	Ile	Val	Pro	Phe	Trp	Ile	Thr	Ala	Ile	Tyr	Val	Phe
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Gln	Val	Thr	Cys	Gly	Thr	Thr	Thr	Leu	Asn	Gly	Leu	Trp	Leu	Asp
3260						3265					3270			
Asp	Thr	Val	Tyr	Cys	Pro	Arg	His	Val	Ile	Cys	Thr	Ala	Glu	Asp
3275						3280					3285			
Met	Leu	Asn	Pro	Asn	Tyr	Glu	Asp	Leu	Leu	Ile	Arg	Lys	Ser	Asn
3290						3295					3300			
His	Ser	Phe	Leu	Val	Gln	Ala	Gly	Asn	Val	Gln	Leu	Arg	Val	Ile
3305						3310					3315			
Gly	His	Ser	Met	Gln	Asn	Cys	Leu	Leu	Arg	Leu	Lys	Val	Asp	Thr
3320						3325					3330			
Ser	Asn	Pro	Lys	Thr	Pro	Lys	Tyr	Lys	Phe	Val	Arg	Ile	Gln	Pro
3335						3340					3345			
Gly	Gln	Thr	Phe	Ser	Val	Leu	Ala	Cys	Tyr	Asn	Gly	Ser	Pro	Ser
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Gly	Val	T												

Gln	Asp	His	Val	Asp	Ile	Leu	Gly	Pro	Leu	Ser	Ala	Gln	Thr	Gly
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Ile	Ala	Val	Leu	Asp	Met	Cys	Ala	Ala	Leu	Lys	Glu	Leu	Leu	Gln
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Asp	Glu	Phe	Thr	Pro	Phe	Asp	Val	Val	Arg	Gln	Cys	Ser	Gly	Val
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Trp	Met	Leu	Leu	Thr	Phe	Leu	Thr	Ser	Leu	Leu	Ile	Leu	Val	Gln
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Pro	Ser	Leu	Ala	Thr	Val	Ala	Tyr	Phe	Asn	Met	Val	Tyr	Met	Pro
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Gln	Cys	Ile	Met	Leu	Val	Tyr	Cys	Phe	Leu	Gly	Tyr	Cys	Cys	Cys
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Cys	Thr	Ser	Val	Val	Leu	Leu	Ser	Val	Leu	Gln	Gln	Leu	Arg	Val
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3875						3880					3885			
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Gln	Ala	Ile	Ala	Ser	Glu	Phe	Ser	Ser	Leu	Pro	Ser	Tyr	Ala	Ala
3920						3925					3930			
Tyr	Ala	Thr	Ala	Gln	Glu	Ala	Tyr	Glu	Gln	Ala	Val	Ala	Asn	Gly
3935						3940					3945			

Asp	Ser	Glu	Val	Val	Leu	Lys	Lys	Leu	Lys	Lys	Ser	Leu	Asn	Val
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Ala	Lys	Ser	Glu	Phe	Asp	Arg	Asp	Ala	Ala	Met	Gln	Arg	Lys	Leu
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Glu	Lys	Met	Ala	Asp	Gln	Ala	Met	Thr	Gln	Met	Tyr	Lys	Gln	Ala
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Arg	Ser	Glu	Asp	Lys	Arg	Ala	Lys	Val	Thr	Ser	Ala	Met	Gln	Thr
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Asn	Ala	Leu	Ala	Tyr	Tyr	Asn	Asn	Ser	Lys	Gly	Gly	Arg	Phe	Val
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Pro	Lys	Ser	Asp	Gly	Thr	Gly	Thr	Ile	Tyr	Thr	Glu	Leu	Glu	Pro
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Pro	Cys	Arg	Phe	Val	Thr	Asp	Thr	Pro	Lys	Gly	Pro	Lys	Val	Lys
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Cys	His	Ile	Asp	His	Pro	Asn	Pro	Lys	Gly	Phe	Cys	Asp	Leu	Lys
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 <211> 2695  
 <212> PRT

## &lt;213&gt; CORONAVIRUS

&lt;400&gt; 75

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Thr Ser Thr Asp Val Val Tyr Arg Ala Phe Asp Ile Tyr Asn Glu Lys
20      25      30
Val Ala Gly Phe Ala Lys Phe Leu Lys Thr Asn Cys Cys Arg Phe Gln
35      40      45
Glu Lys Asp Glu Glu Gly Asn Leu Leu Asp Ser Tyr Phe Val Val Lys
50      55      60
Arg His Thr Met Ser Asn Tyr Gln His Glu Glu Thr Ile Tyr Asn Leu
65      70      75      80
Val Lys Asp Cys Pro Ala Val Ala Val His Asp Phe Phe Lys Phe Arg
85      90      95
Val Asp Gly Asp Met Val Pro His Ile Ser Arg Gln Arg Leu Thr Lys
100     105     110
Tyr Thr Met Ala Asp Leu Val Tyr Ala Leu Arg His Phe Asp Glu Gly
115     120     125
Asn Cys Asp Thr Leu Lys Glu Ile Leu Val Thr Tyr Asn Cys Cys Asp
130     135     140
Asp Asp Tyr Phe Asn Lys Lys Asp Trp Tyr Asp Phe Val Glu Asn Pro
145     150     155     160
Asp Ile Leu Arg Val Tyr Ala Asn Leu Gly Glu Arg Val Arg Gln Ser
165     170     175
Leu Leu Lys Thr Val Gln Phe Cys Asp Ala Met Arg Asp Ala Gly Ile
180     185     190
Val Gly Val Leu Thr Leu Asp Asn Gln Asp Leu Asn Gly Asn Trp Tyr
195     200     205
Asp Phe Gly Asp Phe Val Gln Val Ala Pro Gly Cys Gly Val Pro Ile
210     215     220
Val Asp Ser Tyr Tyr Ser Leu Leu Met Pro Ile Leu Thr Leu Thr Arg
225     230     235     240
Ala Leu Ala Ala Glu Ser His Met Asp Ala Asp Leu Ala Lys Pro Leu
245     250     255
Ile Lys Trp Asp Leu Leu Lys Tyr Asp Phe Thr Glu Glu Arg Leu Cys
260     265     270
Leu Phe Asp Arg Tyr Phe Lys Tyr Trp Asp Gln Thr Tyr His Pro Asn
275     280     285
Cys Ile Asn Cys Leu Asp Asp Arg Cys Ile Leu His Cys Ala Asn Phe
290     295     300
Asn Val Leu Phe Ser Thr Val Phe Pro Pro Thr Ser Phe Gly Pro Leu
305     310     315     320
Val Arg Lys Ile Phe Val Asp Gly Val Pro Phe Val Val Ser Thr Gly
325     330     335
Tyr His Phe Arg Glu Leu Gly Val Val His Asn Gln Asp Val Asn Leu
340     345     350
His Ser Ser Arg Leu Ser Phe Lys Glu Leu Leu Val Tyr Ala Ala Asp
355     360     365
Pro Ala Met His Ala Ala Ser Gly Asn Leu Leu Leu Asp Lys Arg Thr
370     375     380
Thr Cys Phe Ser Val Ala Ala Leu Thr Asn Asn Val Ala Phe Gln Thr
385     390     395     400
Val Lys Pro Gly Asn Phe Asn Lys Asp Phe Tyr Asp Phe Ala Val Ser
405     410     415
Lys Gly Phe Phe Lys Glu Gly Ser Ser Val Glu Leu Lys His Phe Phe
420     425     430
Phe Ala Gln Asp Gly Asn Ala Ala Ile Ser Asp Tyr Asp Tyr Tyr Arg
435     440     445
Tyr Asn Leu Pro Thr Met Cys Asp Ile Arg Gln Leu Leu Phe Val Val
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Glu Val Val Asp Lys Tyr Phe Asp Cys Tyr Asp Gly Gly Cys Ile Asn	465	470	475	480
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Phe Asn Lys Trp Gly Lys Ala Arg Leu Tyr Tyr Asp Ser Met Ser Tyr	500	505	510	
Glu Asp Gln Asp Ala Leu Phe Ala Tyr Thr Lys Arg Asn Val Ile Pro	515	520	525	
Thr Ile Thr Gln Met Asn Leu Lys Tyr Ala Ile Ser Ala Lys Asn Arg	530	535	540	
Ala Arg Thr Val Ala Gly Val Ser Ile Cys Ser Thr Met Thr Asn Arg	545	550	555	560
Gln Phe His Gln Lys Leu Leu Lys Ser Ile Ala Ala Thr Arg Gly Ala	565	570	575	
Thr Val Val Ile Gly Thr Ser Lys Phe Tyr Gly Gly Trp His Asn Met	580	585	590	
Leu Lys Thr Val Tyr Ser Asp Val Glu Thr Pro His Leu Met Gly Trp	595	600	605	
Asp Tyr Pro Lys Cys Asp Arg Ala Met Pro Asn Met Leu Arg Ile Met	610	615	620	
Ala Ser Leu Val Leu Ala Arg Lys His Asn Thr Cys Cys Asn Leu Ser	625	630	635	640
His Arg Phe Tyr Arg Leu Ala Asn Glu Cys Ala Gln Val Leu Ser Glu	645	650	655	
Met Val Met Cys Gly Gly Ser Leu Tyr Val Lys Pro Gly Gly Thr Ser	660	665	670	
Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys	675	680	685	
Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Thr Asp Gly Asn	690	695	700	
Lys Ile Ala Asp Lys Tyr Val Arg Asn Leu Gln His Arg Leu Tyr Glu	705	710	715	720
Cys Leu Tyr Arg Asn Arg Asp Val Asp His Glu Phe Val Asp Glu Phe	725	730	735	
Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met Ile Leu Ser Asp Asp	740	745	750	
Ala Val Val Cys Tyr Asn Ser Asn Tyr Ala Ala Gln Gly Leu Val Ala	755	760	765	
Ser Ile Lys Asn Phe Lys Ala Val Leu Tyr Tyr Gln Asn Asn Val Phe	770	775	780	
Met Ser Glu Ala Lys Cys Trp Thr Glu Thr Asp Leu Thr Lys Gly Pro	785	790	795	800
His Glu Phe Cys Ser Gln His Thr Met Leu Val Lys Gln Gly Asp Asp	805	810	815	
Tyr Val Tyr Leu Pro Tyr Pro Asp Pro Ser Arg Ile Leu Gly Ala Gly	820	825	830	
Cys Phe Val Asp Asp Ile Val Lys Thr Asp Gly Thr Leu Met Ile Glu	835	840	845	
Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Leu Thr Lys His Pro	850	855	860	
Asn Gln Glu Tyr Ala Asp Val Phe His Leu Tyr Leu Gln Tyr Ile Arg	865	870	875	880
Lys Leu His Asp Glu Leu Thr Gly His Met Leu Asp Met Tyr Ser Val	885	890	895	
Met Leu Thr Asn Asp Asn Thr Ser Arg Tyr Trp Glu Pro Glu Phe Tyr	900	905	910	
Glu Ala Met Tyr Thr Pro His Thr Val Leu Gln Ala Val Gly Ala Cys	915	920	925	
Val Leu Cys Asn Ser Gln Thr Ser Leu Arg Cys Gly Ala Cys Ile Arg	930	935	940	
Arg Pro Phe Leu Cys Cys Lys Cys Cys Tyr Asp His Val Ile Ser Thr	945	950	955	960



Ser	His	Lys	Leu	Val	Leu	Ser	Val	Asn	Pro	Tyr	Val	Cys	Asn	Ala	Pro	
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Gly	Cys	Asp	Val	Thr	Asp	Val	Thr	Gln	Leu	Tyr	Leu	Gly	Gly	Met	Ser	
				980					985					990		
Tyr	Tyr	Cys	Lys	Ser	His	Lys	Pro	Pro	Ile	Ser	Phe	Pro	Leu	Cys	Ala	
				995					1000					1005		
Asn	Gly	Gln	Val	Phe	Gly	Leu	Tyr	Lys	Asn	Thr	Cys	Val	Gly	Ser		
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Asp	Asn	Val	Thr	Asp	Phe	Asn	Ala	Ile	Ala	Thr	Cys	Asp	Trp	Thr		
				1025					1030					1035		
Asn	Ala	Gly	Asp	Tyr	Ile	Leu	Ala	Asn	Thr	Cys	Thr	Glu	Arg	Leu		
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Lys	Leu	Phe	Ala	Ala	Glu	Thr	Leu	Lys	Ala	Thr	Glu	Glu	Thr	Phe		
				1055					1060					1065		
Lys	Leu	Ser	Tyr	Gly	Ile	Ala	Thr	Val	Arg	Glu	Val	Leu	Ser	Asp		
				1070					1075					1080		
Arg	Glu	Leu	His	Leu	Ser	Trp	Glu	Val	Gly	Lys	Pro	Arg	Pro	Pro		
				1085					1090					1095		
Leu	Asn	Arg	Asn	Tyr	Val	Phe	Thr	Gly	Tyr	Arg	Val	Thr	Lys	Asn		
				1100					1105					1110		
Ser	Lys	Val	Gln	Ile	Gly	Glu	Tyr	Thr	Phe	Glu	Lys	Gly	Asp	Tyr		
				1115					1120					1125		
Gly	Asp	Ala	Val	Val	Tyr	Arg	Gly	Thr	Thr	Thr	Tyr	Lys	Leu	Asn		
				1130					1135					1140		
Val	Gly	Asp	Tyr	Phe	Val	Leu	Thr	Ser	His	Thr	Val	Met	Pro	Leu		
				1145					1150					1155		
Ser	Ala	Pro	Thr	Leu	Val	Pro	Gln	Glu	His	Tyr	Val	Arg	Ile	Thr		
				1160					1165					1170		
Gly	Leu	Tyr	Pro	Thr	Leu	Asn	Ile	Ser	Asp	Glu	Phe	Ser	Ser	Asn		
				1175					1180					1185		
Val	Ala	Asn	Tyr	Gln	Lys	Val	Gly	Met	Gln	Lys	Tyr	Ser	Thr	Leu		
				1190					1195					1200		
Gln	Gly	Pro	Pro	Gly	Thr	Gly	Lys	Ser	His	Phe	Ala	Ile	Gly	Leu		
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Ala	Leu	Tyr	Tyr	Pro	Ser	Ala	Arg	Ile	Val	Tyr	Thr	Ala	Cys	Ser		
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His	Ala	Ala	Val	Asp	Ala	Leu	Cys	Glu	Lys	Ala	Leu	Lys	Tyr	Leu		
				1235					1240					1245		
Pro	Ile	Asp	Lys	Cys	Ser	Arg	Ile	Ile	Pro	Ala	Arg	Ala	Arg	Val		
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Glu	Cys	Phe	Asp	Lys	Phe	Lys	Val	Asn	Ser	Thr	Leu	Glu	Gln	Tyr		
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Val	Phe	Cys	Thr	Val	Asn	Ala	Leu	Pro	Glu	Thr	Thr	Ala	Asp	Ile		
				1280					1285					1290		
Val	Val	Phe	Asp	Glu	Ile	Ser	Met	Ala	Thr	Asn	Tyr	Asp	Leu	Ser		
				1295					1300					1305		
Val	Val	Asn	Ala	Arg	Leu	Arg	Ala	Lys	His	Tyr	Val	Tyr	Ile	Gly		
				1310					1315					1320		
Asp	Pro	Ala	Gln	Leu	Pro	Ala	Pro	Arg	Thr	Leu	Leu	Thr	Lys	Gly		
				1325					1330					1335		
Thr	Leu	Glu	Pro	Glu	Tyr	Phe	Asn	Ser	Val	Cys						

Trp Arg Lys Ala Val Phe Ile Ser Pro Tyr Asn Ser Gln Asn Ala	1430	1435	1440
Val Ala Ser Lys Ile Leu Gly Leu Pro Thr Gln Thr Val Asp Ser	1445	1450	1455
Ser Gln Gly Ser Glu Tyr Asp Tyr Val Ile Phe Thr Gln Thr Thr	1460	1465	1470
Glu Thr Ala His Ser Cys Asn Val Asn Arg Phe Asn Val Ala Ile	1475	1480	1485
Thr Arg Ala Lys Ile Gly Ile Leu Cys Ile Met Ser Asp Arg Asp	1490	1495	1500
Leu Tyr Asp Lys Leu Gln Phe Thr Ser Leu Glu Ile Pro Arg Arg	1505	1510	1515
Asn Val Ala Thr Leu Gln Ala Glu Asn Val Thr Gly Leu Phe Lys	1520	1525	1530
Asp Cys Ser Lys Ile Ile Thr Gly Leu His Pro Thr Gln Ala Pro	1535	1540	1545
Thr His Leu Ser Val Asp Ile Lys Phe Lys Thr Glu Gly Leu Cys	1550	1555	1560
Val Asp Ile Pro Gly Ile Pro Lys Asp Met Thr Tyr Arg Arg Leu	1565	1570	1575
Ile Ser Met Met Gly Phe Lys Met Asn Tyr Gln Val Asn Gly Tyr	1580	1585	1590
Pro Asn Met Phe Ile Thr Arg Glu Glu Ala Ile Arg His Val Arg	1595	1600	1605
Ala Trp Ile Gly Phe Asp Val Glu Gly Cys His Ala Thr Arg Asp	1610	1615	1620
Ala Val Gly Thr Asn Leu Pro Leu Gln Leu Gly Phe Ser Thr Gly	1625	1630	1635
Val Asn Leu Val Ala Val Thr Gly Tyr Val Asp Thr Glu Asn	1640	1645	1650
Asn Thr Glu Phe Thr Arg Val Asn Ala Lys Pro Pro Pro Gly Asp	1655	1660	1665
Gln Phe Lys His Leu Ile Pro Leu Met Tyr Lys Gly Leu Pro Trp	1670	1675	1680
Asn Val Val Arg Ile Lys Ile Val Gln Met Leu Ser Asp Thr Leu	1685	1690	1695
Lys Gly Leu Ser Asp Arg Val Val Phe Val Leu Trp Ala His Gly	1700	1705	1710
Phe Glu Leu Thr Ser Met Lys Tyr Phe Val Lys Ile Gly Pro Glu	1715	1720	1725
Arg Thr Cys Cys Leu Cys Asp Lys Arg Ala Thr Cys Phe Ser Thr	1730	1735	1740
Ser Ser Asp Thr Tyr Ala Cys Trp Asn His Ser Val Gly Phe Asp	1745	1750	1755
Tyr Val Tyr Asn Pro Phe Met Ile Asp Val Gln Gln Trp Gly Phe	1760	1765	1770
Thr Gly Asn Leu Gln Ser Asn His Asp Gln His Cys Gln Val His	1775	1780	1785
Gly Asn Ala His Val Ala Ser Cys Asp Ala Ile Met Thr Arg Cys	1790	1795	1800
Leu Ala Val His Glu Cys Phe Val Lys Arg Val Asp Trp Ser Val	1805	1810	1815
Glu Tyr Pro Ile Ile Gly Asp Glu Leu Arg Val Asn Ser Ala Cys	1820	1825	1830
Arg Lys Val Gln His Met Val Val Lys Ser Ala Leu Leu Ala Asp	1835	1840	1845
Lys Phe Pro Val Leu His Asp Ile Gly Asn Pro Lys Ala Ile Lys	1850	1855	1860
Cys Val Pro Gln Ala Glu Val Glu Trp Lys Phe Tyr Asp Ala Gln	1865	1870	1875
Pro Cys Ser Asp Lys Ala Tyr Lys Ile Glu Glu Leu Phe Tyr Ser	1880	1885	1890

Tyr	Ala	Thr	His	His	Asp	Lys	Phe	Thr	Asp	Gly	Val	Cys	Leu	Phe
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Trp	Asn	Cys	Asn	Val	Asp	Arg	Tyr	Pro	Ala	Asn	Ala	Ile	Val	Cys
1910						1915					1920			
Arg	Phe	Asp	Thr	Arg	Val	Leu	Ser	Asn	Leu	Asn	Leu	Pro	Gly	Cys
1925						1930					1935			
Asp	Gly	Gly	Ser	Leu	Tyr	Val	Asn	Lys	His	Ala	Phe	His	Thr	Pro
1940						1945					1950			
Ala	Phe	Asp	Lys	Ser	Ala	Phe	Thr	Asn	Leu	Lys	Gln	Leu	Pro	Phe
1955						1960					1965			
Phe	Tyr	Tyr	Ser	Asp	Ser	Pro	Cys	Glu	Ser	His	Gly	Lys	Gln	Val
1970						1975					1980			
Val	Ser	Asp	Ile	Asp	Tyr	Val	Pro	Leu	Lys	Ser	Ala	Thr	Cys	Ile
1985						1990					1995			
Thr	Arg	Cys	Asn	Leu	Gly	Gly	Ala	Val	Cys	Arg	His	His	Ala	Asn
2000						2005					2010			
Glu	Tyr	Arg	Gln	Tyr	Leu	Asp	Ala	Tyr	Asn	Met	Met	Ile	Ser	Ala
2015						2020					2025			
Gly	Phe	Ser	Leu	Trp	Ile	Tyr	Lys	Gln	Phe	Asp	Thr	Tyr	Asn	Leu
2030						2035					2040			
Trp	Asn	Thr	Phe	Thr	Arg	Leu	Gln	Ser	Leu	Glu	Asn	Val	Ala	Tyr
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Pro	Val	Ser	Ile	Ile	Asn	Asn	Ala	Val	Tyr	Thr	Lys	Val	Asp	Gly
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2090						2095					2100			
Val	Ala	Phe	Glu	Leu	Trp	Ala	Lys	Arg	Asn	Ile	Lys	Pro	Val	Pro
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Thr	Ile	Gly	Val	Cys	Thr	Met	Thr	Asp	Ile	Ala	Lys	Lys	Pro	Thr
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Glu	Gly	Gln	Val	Asp	Leu	Phe	Arg	Asn	Ala	Arg	Asn	Gly	Val	Leu
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Ile	Thr	Glu	Gly	Ser	Val	Lys	Gly	Leu	Thr	Pro	Ser	Lys	Gly	Pro
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Phe	Lys	Pro	Arg	Ser	Gln	Met	Glu	Thr	Asp	Phe	Leu	Glu	Leu	Ala
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Asp	Ser	Asp	Leu	Asn	Asp	Phe	Val	Ser	Asp	Ala	Asp	Ser	Thr	Leu
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Ile	Gly	Asp	Cys	Ala	Thr	Val	His	Thr	Ala	Asn	Lys	Trp	Asp	Leu
2510						2515					2520			
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2540						2545					2550			
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2555						2560					2565			
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2570						2575					2580			
Phe	Ser	Trp	Trp	Thr	Ala	Phe	Val	Thr	Asn	Val	Asn	Ala	Ser	Ser
2585						2590					2595			
Ser	Glu	Ala	Phe	Leu	Ile	Gly	Ala	Asn	Tyr	Leu	Gly	Lys	Pro	Lys
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2615						2620					2625			
Arg	Asn	Thr	Asn	Pro	Ile	Gln	Leu	Ser	Ser	Tyr	Ser	Leu	Phe	Asp
2630						2635					2640			
Met	Ser	Lys	Phe	Pro	Leu	Lys	Leu	Arg	Gly	Thr	Ala	Val	Met	Ser
2645						2650					2655			
Leu	Lys	Glu	Asn	Gln	Ile	Asn	Asp	Met	Ile	Tyr	Ser	Leu	Leu	Glu
2660						2665					2670			
Lys	Gly	Arg	Leu	Ile	Ile	Arg	Glu	Asn	Asn	Arg	Val	Val	Val	Ser
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